

# PSYCHE.

## CONTRIBUTION TO A KNOWLEDGE OF THE AUTUMN LIFE-HISTORY OF CERTAIN LITTLE-KNOWN APHIDIDAE.

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I doubt whether our present knowledge of any of the larger families of American insects is in a more chaotic and deplorable state than that relating to the *aphididae*. Though much has been written concerning these insects, comparatively few species have been described in more than one or two of their several forms; and with a few notable exceptions, almost none of the authors who have described species have attempted to trace their seasonal life-histories. Doubtless this condition of things is due largely to the obscurity surrounding the subject, and the imperfect knowledge of the economy of the group both in this country and Europe, as well as to the difficulty of preserving specimens in satisfactory condition for study. The recent researches of Liechtenstein, and Kessler in Europe, and of Riley, Forbes, and others in this country, have given us, however, a substantial working basis for the tracing of the life-histories of these insects, and our knowledge ought hereafter to make more satisfactory progress.

This paper presents a part of the results of field work during the autumn of 1887 on species which have heretofore been very little studied, and about whose autumn life-histories nothing has been recorded. I am under obligations, for many favors received, to my co-workers in the Illinois State Laboratory of Natural History, especially to the Director, Prof. S. A. Forbes, under whose general instructions the investigations have been carried on.

### APHIS CORNIFOLIAE FITCH.

This species was first described by Dr. Fitch, in 1851, in the Fourth report of the regents of the University of New York (p. 65), from apterous females found on *Cornus paniculata*. The description is very brief, and as the date of collection is not given we have no means of knowing whether his specimens were oviparous or viviparous, though they were probably the latter. So far as I can learn the species has not since been recognized, except by Prof. Oestlund who says that it is rather

common on the dog-wood in Minnesota.\* Whether the specimens described below belong to Fitch's species or not I can only conjecture, but as it is the only *Aphis* I have found upon this plant I refer it to this species.

My attention was first called to this insect by finding the winged viviparous females establishing colonies of sexed individuals on the leaves of dog-wood about the middle of October. The insects had evidently migrated to the shrubs under observation either from other shrubs of the same kind or from some other kind of plant for there were no indications of their having developed where they were found. They occurred at the same time and in the same situations as *Schizoneura cornicola*. In fact the autumn life-history of the two species seems to be identical, except that the males of the latter are apterous while those of the former have wings. The eggs of the two species are laid in the same situations and are indistinguishable. Fully developed males and females were observed 24 October when some of the latter were ovipositing on the twigs; and all three forms were taken as late as 10 November.

*Winged viviparous female* ("pseudogyua pupiferat").

Wing expanse . . . . .	6.40 mm.
Width of body . . . . .	.68 mm.
Length of body . . . . .	1.83 mm.
"    " antennae . . . . .	1.41 mm.
"    " cornicles . . . . .	.23 mm.
"    " cauda . . . . .	.11 mm.

\* Fourteenth Rept. State geol. Minn., p. 47.

† Lichtenstein, "Les pucerons. Monographie des aphidiens," p. 150.

Head black, with frontal and post-ocular tubercles well developed. Prothorax black with prominent lateral tubercles. Meso- and metathorax black, somewhat shining. Abdomen green with a row of marginal sub-circular black spots, two transverse spots of same color on dorsum in front of cauda, and a similar quadrangular spot at anus, and just in front of it on ventrum: also occasional small scattered spots on both surfaces. Anterior legs dull yellowish-brown, with coxae, articulations of femora and tibiae, tips of tibiae, and tarsi, dusky. Middle and posterior legs same, except that femora are more or less dusky throughout. Cornicles long, blackish, cylindrical. Cauda dark yellowish-brown. Tegulae greenish-brown. Insertion of wings yellowish. Costal nerve blackish. Cubitus light yellow. Stigma blackish. Posterior nervures brown. Antennae long and slender. Joints I and II short, subequal; III nearly as long as IV + V, and slightly longer than VII; pores distinct; IV and V subequal; VI shorter than any except I and II; VII a little shorter than III. Rostrum yellowish-brown, reaching second coxae.

Described from six specimens taken 24 October 1887, on under side of leaves of *Cornus sanguinea* and *C. sericea*, with colonies of young of the oviparous form about them.

*Winged male.*

Wing expanse . . . . .	5.00 mm.
Width across thorax . . . . .	0.44 mm.
Length of body . . . . .	1.60 mm.
"    " antennae . . . . .	1.20 mm.
"    " cornicles . . . . .	.14 mm.
"    " cauda . . . . .	.10 mm.

Head and thorax black; abdomen dull yellowish-brown, becoming black in older specimens. Eyes dark. Antennae dusky-brown; minutely tuberculous; with many pores. Joints I and II subequal in length; III longest, shorter than IV + V; IV and V subequal; VI about one-half as long as V; VII comparatively short, about equal to V, rough and not tapering, with two setae at tip. Cornicles long, dusky, cylindrical, roughened. Legs hairy; anterior pair yellowish-brown with coxae, articulation of femora and tibiae, tip of tibiae, and tarsi dusky; middle and posterior pairs yellowish brown, with coxae, band on middle of femora, tips of tibiae and tarsi dusky. Cauda broad, brown with curved stiff hairs on lateral and posterior margins. Rostrum reaching middle coxae, yellowish-brown. Tegulae yellowish-green; insertion of veins, costa, and cubitus yellowish-brown; stigma olive brown.

Described from two living specimens taken on leaf and twig of *Cornus sanguinea* 10 November 1887. The genital organs of one were exposed.

I have not been able to prove that these males develop along with the oviparous females from the migrating winged viviparous form, and would not be surprised if they were found to develop on the same plants as the latter, and fly to the colonies of the oviparous form, as has recently been proven to be the case with the hop plant-louse (*Phorodon humuli* Schrank).

*Oviparous female.*

Length of body . . . 1.30 mm.  
Width of body . . . 0.63 mm.

Length of antennae . . . 0.57 mm.  
" " cornicles . . . 0.06 mm.  
" " cauda . . . 0.08 mm.

Green, with a glaucous bloom: somewhat flattened, widest at middle and tapering both ways. Cornicles and margin of cauda, dusky; sub-quadrangular dusky spot on anus. Eyes reddish-brown. Antennae slender, light yellowish-brown, with dusky tips; 6-jointed, I and II short, III long, IV two-thirds as long as III, filament long. Rostrum light yellowish-brown with dusky tip; reaching posterior coxae. Legs light yellowish-brown, tarsi with dusky tips; coxae greenish; posterior tibiae distinctly swollen. Cauda hairy.

Described from one specimen taken in act of ovipositing in axil of twig of *Cornus sanguinea*. 24 October 1887.

Of many other specimens examined the only perceptible difference was in the depth of coloring of the body, the older specimens becoming more or less brownish.

*Egg.*

Elongate oval. 0.95 mm. long. 0.23 wide. Green when first deposited but becoming black by exposure.

Described from a specimen just laid by the female mentioned above. Probably it would have shrunk some after being laid.

APHIS SP. ON AMARANTUS ALBUS.

On 19 October 1887, I found a species of *Aphis* very abundant on a plant of *Amarantus albus* growing near one of the university barns. So far as I could see the species was rep-

resented only by wingless males and oviparous females, which abounded on the under surface of the leaves. Many pairs were mating, and many of the females were laying eggs on the under surface of the leaves, especially along the midrib. The eggs were of the normal form, light colored when first extruded and becoming dark on exposure. About a fortnight later when the plant had been killed by frost the aphides were abundant in the rubbish beneath the plant and some of them had penetrated the soil about the roots. Both forms were still abundant. A few had wandered to a neighboring plant of some species of *Polygonum*.

I find no mention of any aphid infesting *Amarantus albus* in this country, and as the plant is supposed to be naturalized from the tropics it probably does not occur in Europe. In Lichtenstein's\* list of host-plants, in which are included all genera known to be infested by aphides. *Amarantus* is not mentioned. Of course this species may also occur on some other plant, but I have found nothing like it in extensive and careful collecting this fall. But although it is probable that the species is undescribed I prefer to leave it unnamed (at least until the other forms can be obtained) rather than run the risk of uselessly burdening the synonymy of the group.

*Wingless male.*

Width of body . . . .	0.50 mm.
Length of body . . . .	1.10 mm.
“ “ antennae . . . .	1.20 mm.
“ “ cornicles . . . .	0.08 mm.

Flattened, long and narrow. General color black, mottled with green especially on thorax and abdomen. Head large, black, with a well developed frontal tubercle. Dorsum of thorax black with more or less green on margins. Dorsum of abdomen greenish black, more or less distinctly marked with black transverse patches, especially posteriorly. Cornicles, legs and eyes black. Legs very long with short stiff hairs. Antennae long, robust, roughened with tubercles which are quite large on basal joints, but smaller apically. Rostrum black, reaching cephalic margin of posterior coxae. Ventrums of thorax black, of abdomen green.

Described from one living specimen taken *in copula* on *Amarantus albus*, 19 October 1887.

*Oviparous female.*

Width of body . . . .	0.75 mm.
Length of body . . . .	1.60 mm.
“ “ antennae . . . .	0.50 mm.
“ “ cornicles . . . .	0.10 mm.

Body green, with powdery white flocculence, head dusky. Antennae white with dusky tips, roughened by sparse minute tubercles tipped with fine short hairs. Legs whitish, with dusky coxae and tarsi, and more or less dusky on articulations: somewhat hairy. Cornicles nearly color of body. Eyes black. Anus and a quadrangular patch just in front on ventrum, dusky. Rostrum not quite reaching middle coxae: dusky at base and apex.

Described from one living specimen taken *in copula* on *Amarantus albus*, 20 October 1887.

\*Les pucerons, p. 76-140.

Another specimen taken *in copula* on the same plant at the same time is slightly yellowish, and has the members (cornicles, antennae, and legs) nearly dusky throughout. A large number of other specimens examined did not differ materially from these two types.

SIPHONOPHORA RUDBECKIAE (FITCH).

This species was first described as *Aphis rudbeckiae* by Dr. Fitch in the Fourth report of the regents of the University of New York (1851, p. 66). The description is very brief and drawn up from winged specimens (said to be males) found upon *Rudbeckia laciniata*, *Solidago serotina* and *S. gigantea*. No dates of collection are given.

In the Proceedings of the Entomological society of Philadelphia for December, 1862 (vol. 1, p. 298) Mr. Walsh describes winged male and female specimens of an aphid found on *Silphium perfoliatum* and on an undetermined *Cirsium* which he doubtfully identifies as *Aphis rudbeckiae*. Certain discrepancies as to color between his specimens and those of Fitch are pointed out. No dates are given.

In Bulletin no. 2 of the Illinois State laboratory of natural history (1877, p. 4) Dr. Cyrus Thomas includes this species in his list of *aphidini* referring it however to the genus *Siphonophora*. The host plants mentioned are *Rudbeckia laciniata*, *Ambrosia trifida*, and *Solidago serotina*. No descriptions are given.

The species is next mentioned by Mr. J. Monell (Bull. U. S. geol.

surv., vol. 5, p. 21), who records eleven host-plants, and remarks that the species is probably the commonest of all American aphidians. No life-history details are mentioned.

Again in the Eighth report of the state entomologist of Illinois (p. 49-50) Dr. Thomas gives a full description of the winged viviparous female (though whether the summer or autumn form we cannot tell) and records the occurrence of a green variety, but makes no mention of the sexed forms, nor of the method of hibernation.

The only other important mention of the species that has come to my notice is found in Professor O. W. Oestlund's recent list of the *aphididae* of Minnesota (op. cit., p. 20) where it is said to be found abundantly throughout the season on *Solidago serotina* and *Silphium perfoliatum*. In discussing the apterous males of an allied species (*S. frigidæ* Oestlund) the author states: "Wingless males have been observed in both of the above mentioned species"—*S. rudbeckiae* and *S. ambrosiæ*, but he describes neither of them, and omits to state whether the sex was ascertained by dissection or field observations. I describe below a winged male, of the sex of which there can be doubt, so that this is another species in which apterous and winged males have been observed. I watched carefully for apterous males but found none. It is to be hoped that in order to establish the fact beyond a doubt the two forms of this sex may be found in the same or adjoining colonies.

My observations upon the species began about the middle of October 1887, when I found the winged viviparous females (*pseudogyna pupifera*) establishing colonies of sexed individuals upon the leaves and stems of various *compositae*, especially, *Solidago* and *Lactuca*. Although the red specimens were by far the commoner, the green variety mentioned by Dr. Thomas was frequently seen. The first specimens seen *in copula* were taken on 18 October, and the first eggs were found on the stem of *Lactuca canadense* on 28 October, in company with oviparous females. On 9 November, a careful examination was made of many old plants which had previously been infested by the lice (as shown by the cast skins), but no living specimens nor eggs were found. The roots and the earth about the roots was also examined with like result. Two days later however the oviparous females were found abundantly on the under leaf-surface of many young plants of *Lactuca* and *Muhlenbergia*, where they were depositing eggs freely. Hence I concluded that the occurrence of eggs on the stems of old plants is exceptional, and that the normal habit of the species is to deposit the eggs on the young plants of such biennials or perennials as it infests.

*Winged viviparous female (pseudogyna pupifera).*

Expanse of wings . . . . .	7.6 mm.
Width of body (across thorax) . . . . .	0.9 mm.
Length of body . . . . .	3.0 mm.
“ “ antennae . . . . .	3.2 mm.
“ “ cornicles . . . . .	1.0 mm.
“ “ cauda . . . . .	0.3 mm.

Head dark reddish-brown, shining. Prothorax of same color. Meso- and metathorax slightly darker, shining. Abdomen nearly black with a slight greenish tinge, shining. Ventral surface greenish black. Antennae long, tapering, black except basal joint, which is unicolorous with head; with rows of rather sparse hairs. Joint I short, large; II small; III long, tuberculate; IV and V subequal, each nearly as long as III; VI very short, about  $\frac{1}{3}$  as long as V; VI-VII very long, slender. Legs long, hairy; distad of middle of femora brownish-black, proximad dull greenish- or yellowish-brown. Cornicles very long, black, cylindrical, with flange at tip. Cauda long, greenish. Rostrum greenish with dusky tip, reaching second coxae. Tegulae green. Insertion of veins yellowish green. Costa brown; cubitus yellowish; stigma greenish; other veins brown.

The depth of coloring of the body varies considerably. One specimen examined was very dark, another quite light.

Described from two specimens taken on *Lactuca canadense* 25 October 1887, establishing colonies of young.

*Winged male.*

Wing expanse . . . . .	6.8 mm.
Width of body . . . . .	0.8 mm.
Length of body . . . . .	2.4 mm.
“ “ antennae . . . . .	4.0 mm.
“ “ cornicles . . . . .	0.4 mm.
“ “ cauda . . . . .	0.2 mm.

Dull yellowish-brown, slightly darker on dorsum of thorax and central parts of ventrum. Antennae black, slightly brownish at base. Legs very long, black, except coxae, trochanters

and proximal portions of tibiae yellowish. Cauda long. Cornicles long, black, contracted at middle, dilated at tip. Basal wing-veins and tegulae light yellowish. Beak reaching posterior coxae, yellow at base, becoming brownish toward apex.

Described from one specimen taken *in copula* on *Solidago*, 18 October 1887.

*Oviparous female.*

Width of body . . . .	1.2 mm.
Length of body . . . .	3.0 mm.
“ “ antennae . . . .	4.0 mm.
“ “ cornicles . . . .	0.7 mm.
“ “ cauda . . . .	2.5 mm.

Above clear reddish-brown, slightly darker on thorax. Cauda light yellow, with a few rather long hairs. Cornicles black, long, large at base and slightly tapering apically. Antennae blackish, very long, with sparse stiff hairs. Under surface much like upper. Rostrum dark brown, reaching to anterior margin of posterior coxae. Legs very long; coxae unicolorous with under surface; femora and tibiae light brown (very much lighter than body) with black tips; tarsi black. Abdomen large.

Described from one specimen (having ten well developed eggs in the abdomen) taken on *Lactuca* or *Mulgedium*, 22 October 1887.

SCHIZONEURA CORNICOLA (WALSH).

Whether the species described by Walsh under the above name is the same as the European *Schizoneura corni*, or not, I cannot tell, nor am I certain that the forms described below

are the same as those found by Walsh, whose description (Proc. Ent. soc. Phil., vol. 1, p. 304) is brief and was drawn up from dried specimens. There is every probability, however, that they are the same. Walsh doubtfully refers the species to the genus *Eriosoma*, and states that “numerous [winged?] individuals unaccompanied by any flocculent matter, and so far as I recollect by larvae, occurred in September, on the lower side of the leaves of the red osier dogwood.”

Thomas quotes Walsh’s note and refers the species to *Schizoneura*, but does not mention having seen the insect.

My observations upon the species began about the middle of October, 1887, when winged viviparous females were abundant upon the under surface of the leaves of *Cornus sanguinea* and *C. sericea*, and were just beginning to establish colonies. No other form was present, which led me to think that these winged individuals had migrated from some other species of plant, as had they been developed on *Cornus* there would probably have been indications of it—either cast skins or belated colonies. These winged individuals were occasionally seen upon other plants, but their presence was evidently accidental, as none of them were establishing colonies.

On 24 October, the dogwood leaves were covered with colonies of the three forms.—winged viviparous females (*pseudogyna pupifera*), apterous males, and oviparous

females. Many of the latter were mating, and some of the oviparous females had begun to deposit eggs on the twigs about the buds. From this time on the winged individuals became less numerous until, by 11 November, they were only rarely found. At the latter date, however, many of the males and females were still on the leaves and twigs.

*Winged viviparous female (pseudogyna pupifera).*

Expanse of wings . . .	6 mm.
Length of body . . .	2 mm.
Width of body . . .	8 mm.
Length of antennae . . .	9 mm.

Black above, except anterior and lateral margins of abdomen, and in many specimens more or less of posterior portion. Beneath black, except prothorax and abdomen (save a black patch in front of anus) which are dull, whitish-brown. Rostrum black, except a more or less distinct lighter patch near base, hairy, reaching posterior coxæ. Legs robust, black, except a short, brownish space at base of anterior femora; thickly provided with brown hairs. Antennae robust, beset with brown hairs. Joints I and II, short, smooth; III, long, with row of tubercles on its outer ventro-lateral surface; IV and V subequal, with tubercles as on III; VI, a little longer than V, excavated on its outer lateral surface about two-thirds distance from base. Wing veins mostly brown. Stigma brownish, with interior portion darker.

Described from many specimens taken 24 October 1887, on leaves of

*Cornus sanguinea* and *C. sericea*, where for some time previous they had been very numerous, founding sexed colonies. Usually occurring on the under surface.

*Apterous male.*

Width of body . . .	0.05 mm.
Length of body . . .	0.89 mm.
Length of antennae . . .	0.47 mm.

Body and members, brownish or brownish-black, with numerous brown hairs. Eyes black. Body flattened, long and narrow, with nearly parallel sides. Antennae half as long as body. Joint I, short, swollen; II, small; III, longest; IV and V, subequal; the latter excavated on its apical lateral surface. Legs long, robust, same color as body. Rostrum robust, reaching anterior margin of posterior coxæ.

Described from several living specimens (part taken in *copula*), from *Cornus sericea*, collected 24 October 1887.

*Oviparous female.*

Width of body . . .	0.50 mm.
Length of body . . .	1.14 mm.
Length of antennae . . .	0.35 mm.

Green, or greenish-brown, slightly darker anteriorly. Shape, elongate-oval; sparsely clothed with brown hairs. Eyes blackish. Antennae green, slightly darker apically; joint III longest. V slightly swollen in middle. Rostrum robust, green, darker at tip, reaching anterior margin of posterior coxæ. Legs unicolorous with body, dusky apically.

*Egg.*

Elongate oval, 0.56 mm. long, 0.2 wide.



Green at first, becoming black by exposure. Deposited on bark, in and about the axils of buds and small branches.

Described from many specimens on *Cornus sericea*, 24 October 1887.

CALLIPTERUS DISCOLOR. MONELL.

This handsome species was described by Mr. Monell, in 1879, from winged specimens found in Missouri, on the under side of the leaves of *Quercus bicolor*, in May. So far as I know it has not since been treated of.

I first noticed the species about the middle of October, when winged viviparous females were establishing colonies of sexed individuals on the under surface of the leaves of the bur-oak (*Quercus macrocarpa* Mx.) on the university farm. I was unable to describe this form at once, and when I next visited the trees, 28 October, only the sexed individuals were present.

As noted below, the eggs are deposited on the leaves, and very likely the young hatch in spring and crawl upon the twigs before the leaves fall, as it is well known that many oak leaves, especially on young trees, do not drop until quite late in spring.

*Winged male.*

Expanse of wings . . . . .	2.60 mm.
Width of body (across prothorax) . . . . .	0.45 mm.
Width of body ( " mesothorax) . . . . .	0.65 mm.
Length of body . . . . .	2.00 mm.
Length of antennae . . . . .	1.35 mm.

Light yellow, with black markings. Head above subtriangular, black. Pro-

notum black, with an oblique yellowish line on each side near the margin, and a transverse line (interrupted by two black spots) on the posterior margin. Meso- and metanotum, black, with a yellow stripe on each margin. Dorsum of abdomen, yellow, with a series of transverse dark stripes along the middle, a row of dark spots on each lateral margin, and numerous smaller scattered spots on its surface. Ventral surface of head dusky green; of prothorax, yellowish; of meso- and metathorax, dark green; of abdomen, yellowish, with transverse dark stripes, especially towards anus. Eyes red. Rostrum reaching slightly caudad of caudal margin of anterior coxae; greenish-yellow with base dusky. Legs yellowish, more or less dusky, with fine hairs. Antennae dusky brown or black, darker apically, long and tapering. Joints I and II subequal in length, I being larger transversely; III long; IV two-thirds as long as III; V slightly shorter than IV; VI and VII subequal, both shorter than V; VII slender. Membrane of wing, whitish. Tegulae and basal portion of veins, yellowish. Wing-veins brownish black, with more or less clouding of the membrane along their margins, especially where they terminate. Stigma wide, dusky at lateral and caudal margins, but whitish in middle and front.

Described from three living specimens taken on under leaf-surface of *Quercus macrocarpa*, 29 October 1887.

The depth of coloring of the body and members varies considerably with the age of the specimen.

This form is developed along with the oviparous female on the leaves of various oaks. Late in October 1887, I examined great numbers of colonies and frequently saw the pupae of this winged form on the leaves; and in several instances I saw the winged adults emerging from the pupa-skin.

*Oviparous female.*

Length of body . . . . .	2.00 mm.
Width of body (above anterior coxae)	0.50 mm.
“ “ “ (above middle coxae)	0.74 mm.
“ “ “ (across middle of abdomen)	1.00 mm.
Antennae . . . . .	1.20 mm.
Cornicles . . . . .	0.05 mm.

Light yellow; dorsum with four longitudinal rows of mostly subquadrangular spots of a yellowish-brown color, two of the rows being on the lateral margins, and the other two on each side the meson. On the abdomen are various smaller spots of the same color. Under surface immaculate. Body provided with numerous rather long brown hairs, having slightly enlarged truncate tips, distribution on dorsum corresponding to that of the colored spots. Head and prothorax subquadrangular; former with a small tubercle surmounted by a hair in front on each side of the meson. At posterior margin of prothorax body suddenly widens and expands to middle of abdomen, when it begins to contract posteriorly and ends in a long tapering ovipositor. Cornicles yellow, short, large. Eyes yellow, with a red spot on

their lower surface. Antennae slender, tapering, yellowish-brown with dusky articulations and tips. Joints I and II as usual; III very long, equal to IV + V; IV and V subequal; VI short, half as long as V; VII also short, slightly longer than VI. Legs robust, dusky yellowish-brown, with many short hairs. Tarsi black. Rostrum short, reaching just back of anterior coxae, yellow, with black tips.

Described from three living specimens from *Quercus macrocarpa*, 27 October 1887.

The depth of coloring of this form varies much. Many specimens have a distinct reddish tinge, others are more or less brownish, and still others (apparently those which have recently passed the last moult) are green. The depth of color of the members varies with that of the body—those specimens which are green having legs and antennae also more or less green, those which are brown having legs and antennae brownish, etc.

*Egg.*

Elongate, subcylindrical; 0.47 mm. long, 0.17 mm. wide. Green or yellowish when first deposited, but becoming darker on exposure. Deposited by the side of the midrib or secondary vein on the under surface of the leaf, stuck in among the long leaf hairs.

Described from two specimens taken on leaf of *Quercus macrocarpa*, 28 October 1887.

The long ovipositor of the female no doubt aids greatly in inserting the egg in its proper position close to the midrib

among the dense pubescence that covers the under leaf surface. If the abdomen terminated as does that of those species which oviposit on bark, the egg would often be caught on the ends of the hairs and blown away.

In order to determine the numbers of eggs laid by a single female I crushed several specimens in alcohol on a glass slide and counted the number of well developed eggs contained within the abdomen. The greatest number found was 25, and the least 10; the other specimens containing 10, 13, 10, 20, 15, 11 and 13 respectively.

*CHAITOPHORUS VIMINALIS* Monell (?).

Mr. J. Monell has described,\* under the name *Chaitophorus viminalis* wingless and winged specimens of a plant louse on *Salix lucida* and *S. babylonica*. No dates are given but probably both these forms were viviparous.

Late in October I found sexed individuals of a species of *Chaitophorus* abundant on some bushes of *Salix alba* in the university arboretum. It was evidently too late for the viviparous forms, as none were found. Hence I refer these specimens to *viminalis* with some hesitancy. They are not *C. smithiae*, however, as the nectaries are short and thick, and Monell states that in the latter they are long and flaring at the tip, a character which places the species (*smithiae*) in the genus *Cladobius*.

*Winged male.*

Expanse of wings . . . 4.3 mm.  
Width of body . . . . 0.6 mm.

Length of body . . . 1.50 mm.  
" antennae . . . 1.15 mm.  
" cornicles . . . 0.05 mm.  
" cauda . . . 0.08 mm.

Black, somewhat shining; abdomen greenish-black. Body and members furnished with rather long brown hairs. Antennae black, except base of third joint which is brownish, with a few long brown hairs. Joints I and II subequal; III long, not quite equal to IV + V; IV and V subequal; VI short, rather thick; VII long, slender, nearly three times as long as VI. Cornicles short, greenish-brown. Rostrum reaching slightly back of anterior coxae, greenish black. Legs blackish, with tibiae pale brown. Cauda broad, expanding from base to middle. Wing membrane whitish. Tegulae and base of wing-veins yellowish-brown, as are the costa and cubitus; stigma, and other veins brownish-black.

Described from one living specimen taken on under leaf-surface of *Salix alba*, 3 October 1887. Genital organs were extruded.

*Oviparous female.*

Length of body . . . . 16.5 mm.  
Width of body . . . . 0.9 mm.

Dull yellowish-brown or blackish. Body and appendages furnished with numerous long brown hairs. Eyes dark. Antennae dusky brown or blackish, robust. Joints I and II subequal; III shorter than IV + V; IV slightly longer than V, which is slightly longer than VI; VII rather thick, slightly longer than III. Legs robust, dusky yellowish-brown or blackish. Rostrum robust, unicolorous with body, reach-

\*Bull. U. S. geol. surv., vol. 5, p. 31.

ing anterior margin of posterior coxae. Cornicles very short, unicolorous with body.

Described from many specimens taken in company with young, and winged males on under leaf-surface of *Salix alba*, 31 October, 1887.

*Egg.*

Oval; 0.6 mm. long, 0.3 mm. wide. Yellow when first extruded. The

only specimens seen were deposited on the under leaf-surface, but I surmise that they may be usually deposited about the buds, though after considerable search I have found none so placed.

Described from five specimens taken, together with oviparous females, on the under leaf surface of *Salix alba*, 8 November 1887.

## THE PIONEER PAINTER OF NORTH AMERICAN INSECTS.

BY HERMANN AUGUST HAGEN, CAMBRIDGE, MASS.

Marc Catesby was born in 1679 or 1680 and died 23 Dec. 1749, at London. His early inclination to study natural history was much suppressed by his residing remote from London, I do not know where. Having relatives in Virginia he decided to go there, to study plants and animals foreign to England. He arrived there 23 April 1712 and returned to England in 1719. By generous friends he was induced and urged to go again to America, and arrived 23 May 1722, at Charleston, S. Carolina. He employed the first year collecting, describing and figuring plants and animals. After living nearly three years in Carolina, Georgia and Florida he went to the Bahamas, visiting Providence and some adjacent islands. As he was not bred a painter he asks indulgence for some faults in his pictures. Returning to England in 1726 and wishing to publish the result of his labors he tried to teach himself the art of etching. As far as I

understand the notices given in the preface of his book (out of which are taken the above facts) he colored the plates himself. He was a Fellow of the Royal society. It is today rather difficult to understand how the publication of such an expensive work was at all possible, as the list of the subscribers contains only 165 names. He was induced by his patrons to study the birds rather than describe promiscuously insects, and other animals. Therefore he was not able to delineate a great number of insects. Those given are, as far as I know, the first North American insects figured after living specimens and published colored. The figures are recognizable, though sometimes not good. The descriptions are short and prove that he was not an entomologist. Nevertheless the work of a pioneer should not be entirely forgotten.

Below I give the title and a list of the insects figured: The natural history of